

# Time Scale Effects on Accuracy of Sediment Yield Estimation

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## 1. Abstract

Estimation of sediment yield has always been supposed as one of the most problematic task for water specialists owing to lack of regular and persistent sediment measurement data. Because of the aforesaid issue, sediment estimation is usually made using data obtained through random sampling conducted in a particular period. In the present study, an attempt has been made to determine the range of accuracy variation in sediment estimation for a part of Haraz basin in Iran and comprises some 4023 km<sup>2</sup>. The precise suspended sediment data collection in daily basis was manually made for the period of March 2004 up to March 2005 with the help of bottle samplers and using integration method. The annual sediment yield was determined on daily data basis and the sediment yield was also estimated using selection of extreme data in different combination in monthly and seasonal basis. The selected sediment data were consequently converted to annual sediment yield and ultimately compared with that obtained in daily basis. The results of the study verified a drastic variation in sediment yield estimation and then necessitate the regular and accurate measurement in data collection in the study area.

**Keywords:** *Time Scale, Sediment Estimation, Accuracy Evaluation, Haraz River, Iran*

## 2. Introduction

Proper studying the sediment yield as one of the most important output of the watershed is a necessary prerequisite for sound watershed management and hydraulic structure design. The spatiotemporal variation of sediment yield has therefore been taken into account to consider the importance of factors affecting on sediment yield (Walling and Fang, 2003). Suspended sediment also is supposed as an indicator for the soil erosion occurred in the upland watershed (Fuller *et al.*, 2003) and can be used for watershed prioritization. Much amount of sediment load may be transported during some particular period (Ozturk and Apaydin, 2001; Sadeghi, 2004 and Parker and Trotman, 2004) which accordingly necessitate the adequate number of sampling. In the other side, the frequent sampling is very tedious and costly and thus the accuracy of irregular sampling has to be determined to evaluate the efficiency of sediment estimation which itself can project the proper manner of sediment sampling scheduling. In the present study the effect of time scale on sediment yield estimation has been considered for a medium size watershed in Iran.

## 3. Methods

In order to achieve the study goal, a medium size watershed located in Haraz large watershed in Iran and comprises 4023 km<sup>2</sup> was selected. The Panjab study area occupies some 230km<sup>2</sup> and the outlet of the study watershed is situated on 36 05 47 N altitude and 52 16 04 E longitude. The general feature and other important specification of the study watershed have been respectively shown in Fig.1 and Table 1.

The precise suspended sediment data collection in daily basis was manually made for the period of March 2004 up to March 2005 with the help of bottle samplers and using integration method (Singh, 1992). The amount of suspended sediment was then determined using weighting method. The annual sediment yield was then calculated on daily data basis. The sediment yield was also estimated using selection of extreme data in monthly and seasonal basis. The selected sediment data were consequently converted to annual specific sediment yield and ultimately compared with that obtained in daily basis applying estimation error and bias criteria (Das, 2000).

## 4. Results

The daily sediment was calculated using analyzing daily collected suspended sediment samples and with respect to mean daily discharge. The daily values then summed up and the annual suspended sediment yield was found to be equal to 594.95 t.Km<sup>-2</sup>.y<sup>-1</sup>. The annual sediment yield was also determined using applying the minimum and the maximum values reported during each month and consequently each season and then converted into annual sediment yield. The results of the analyses have been demonstrated in Table 2.



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